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EXAMINER	
ORTIZ RODRIGUEZ, CARLOS R	

ART UNIT	PAPER NUMBER
2125	5

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application 09/964,939	Applicant(s) DISCENZO ET AL.	
	Examiner Carlos Ortiz-Rodriguez	Art Unit 2125	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4,6,10,21 and 22 rejected under 35 U.S.C. 102(b) as being anticipated by Irvin U.S Patent No. 5,742,500.

Regarding claim 1, Irvin discloses a method of controlling a system having at least one motorized pump and an associated motor drive(see col 1 line 49), comprising:
selecting a desired operating point within an allowable range of operation about a system setpoint(see col 1 lines 50-51) according to performance characteristics associated with a plurality of components in the system(see col 1 lines 49-54); and
automatically controlling the system according to the desired operating point(see col 1 lines 42-45).

Regarding claim 2, Irvin further discloses the method, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a plurality of components in the system comprises efficiencies of at least two of the motor, the pump, and the motor drive(see col 1 lines 24-33).

Regarding claim 3, Irvin further discloses the method, comprising obtaining the system setpoint and the allowable range of operation from a user(see col 4 lines 23-31).

Regarding claim 4, Irvin further discloses the method, wherein selecting the desired operating point comprises: correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information; and selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information(see col 10 lines 31-34).

Regarding claim 6, Irvin further discloses the method, comprising obtaining at least one of the efficiency information, the allowable range, and the system setpoint from a user(see col 4 lines 23-31).

Regarding claim 10, Irvin further discloses the method, comprising obtaining at least a portion of one of the efficiency information, the allowable range, and the system setpoint from prior operation of the system(see col 2 lines 15-17).

Regarding claim 21, Irvin further discloses the method, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump. and a motor drive providing electrical power to the motor, (see col 1 line 49 and col 1 lines 23-25 and fig 1), and wherein the performance characteristics associated with a plurality of components in the

system comprises cost of operation associated with at least two of the motor, the pump, and the motor drive(see col 13 line 2).

Regarding claim 22, Irvin further discloses the method, wherein selecting the desired operating point comprises measuring at least one process variable from a sensor associated with the system(see col 12 line 4).

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 40-42 rejected under 35 U.S.C. 102(e) as being anticipated by Hays et al. U.S Patent No. 6,260,004.

Regarding claim 40, Hays et al. discloses a controller for providing a control signal to a motor drive to operate a motorized pump in a controlled fashion, comprising(see col 1 lines 39-47 and col 6 lines 54-57): a diagnostic component operatively connected to the pump to diagnose an operating condition associated with the pump;
wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump(see abstract lines 1-3 and col 10 lines 39-43).

Regarding claim 41, Hays et al. further discloses the controller, wherein the diagnostic component performs signature analysis of at least one sensor signal from a sensor associated with the pump in order to diagnose the operating condition associated with the pump (see abstract lines 6-11).

Regarding claim 42, Hays et al. further discloses the controller wherein the at least one sensor signal is related to one of flow, pressure, current, noise vibration, and temperature associated with the pump(see col 12 line 66).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 5,7-9, 11-20 and 23-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irvin U.S Patent No. 5,742,500 in view of Crane U.S. Patent No. 4,584,654.

Regarding claim 5, Irvin discloses all the limitations of base claim 4.

But, Irvin fails to disclose providing a motor speed signal to the motor drive according to the desired operating point.

However, Crane discloses a method wherein controlling the system according to the desired operating point comprises providing a motor speed signal to the motor drive according to the desired operating point(see col 3 lines 13-15).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Irvin and combining it with the invention disclosed by Crane. The results of this combination would lead to system and method for dynamic multi-objective optimization of pumping system operation and diagnostic.

One of ordinary skill in the art would have been motivated to do this modification because in order to obtain optimum operating characteristics and efficiencies, as suggested by Crane.

Regarding claim 7, Irvin discloses all the limitations of base claim 4.

But Irvin fails to disclose a host computer.

However, Crane discloses the method further comprising obtaining at least one of the efficiency information, the allowable range and the system setpoint from a host computer(see col 3 lines 38-43).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Irvin and combining it with the invention disclosed by Crane.

One of ordinary skill in the art would have been motivated to do this modification because it is known in the art that host computers are used as central controllers to obtain operating overall conditions as suggested by Crane.

Regarding claim 8, Irvin in combination with Crane disclose all the limitations of base claim 7. Crane further discloses the method, wherein the at least one of the efficiency information the allowable range, and the system setpoint is obtained via a network(see col 4 lines 65-67).

Regarding claim 9, Irvin in combination with Crane disclose all the limitations of base claim 8. Crane further discloses the method wherein the at least one of the efficiency information, the allowable range, and the system setpoint is obtained via wireless communications(see col 4 lines 61-65).

Regarding claim 11, Irvin in combination with Crane disclose all the limitations of base claim 1. Crane further discloses the method, wherein selecting the desired operating point comprises: correlating component performance information associated with at least two components in the system in order to derive correlated system performance information; and selecting the desired operating point as the optimum performance point within the allowable range of operation according to the correlated system performance information(see col 7 lines 42-56 and col 7 line 68 and col 8 lines 1-2).

Regarding claim 12, Irvin in combination with Crane disclose all the limitations of base claim 11. Crane further discloses the method, wherein controlling the system according to the desired operating point comprises providing a setpoint to a controller associated with the system according to the desired operating point(see col 7 lines 66-68 and col 8 lines 1-2).

Regarding claim 13, Irvin in combination with Crane disclose all the limitations of base claim 11. Irvin further discloses the method, comprising obtaining at least one of the performance information, the allowable range, and the system setpoint from a user(see col 4 lines 23-31).

Regarding claim 14, Irvin in combination with Crane disclose all the limitations of base claim 11. Crane further discloses the method, comprising obtaining at least one of the performance information, the allowable range. and the system setpoint from a host computer(see col 3 lines 38-43).

Regarding claim 15, Irvin in combination with Crane disclose all the limitations of base claim 14. Crane further discloses the method, wherein the at least one of the performance information, the allowable range, and the system setpoint is obtained via a network(see col 4 lines 65-67).

Regarding claim 16, Irvin in combination with Crane disclose all the limitations of base claim 15. Crane further discloses the method, wherein the at least one of the performance information, the allowable range, and the system setpoint is obtained via wireless communications(see col 4 lines 61-65).

Regarding claim 17, Irvin in combination with Crane disclose all the limitations of base claim 11. Irvin further discloses the method, further comprising obtaining at least a portion of one of the performance information, the allowable range, and the system setpoint from prior operation of the system(see col 2 lines 15-17).

Regarding claim 18, Irvin in combination with Crane disclose all the limitations of base claim 11. Irvin further discloses the method, wherein the component performance information

comprises at least one of life cycle cost information, efficiency information, life expectancy information, safety information, emissions information, operational cost information. MTBF information, noise information. and vibration information(see col 13 line 2).

Regarding claim 19, Irvin in combination with Crane disclose all the limitations of base claim 18. Irvin further discloses the method, wherein the system comprises a motorized pump system for pumping fluid, having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor (see col 1 line 49 and col 1 lines 23-25 and fig 1), wherein the component performance information comprises efficiency information related to at least two of the motor, the pump, and the motor drive(see col 2 lines 44-47), and wherein the correlated system performance information comprises cost information related to the system operational cost per unit of fluid pumped(see col 13 lines 2-3).

Regarding claim 20, Irvin disclose all the limitations of base claim 1. Irvin further discloses the method, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump. and a motor drive providing electrical power to the motor(see col 1 line 49 and col 1 lines 23-25 and fig 1).

But, Irvin fails to disclose that the performance characteristics associated with a plurality of components in the system comprises life expectancies.

However, Crane discloses the performance characteristics associated with a plurality of components in the system comprises life expectancies and wherein the performance

characteristics associated with a plurality of components in the system comprises life expectancies of at least two of the motor, the pump, and the motor drive(see col 2 lines 52-59) .

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Irvin and combining it with the invention disclosed by Crane.

One of ordinary skill in the art would have been motivated to do this modification because it is known in the art that characteristics related with the life expectancies of the motors must be considered in order to obtain a more efficient operation of the system as suggested by Crane.

Regarding claim 23 and 34-35, Irvin discloses a control system for controlling a process having a pump with an associated motor, the control system comprising: a motor drive providing electrical power to the motor(see col 1 line 49 and col 1 lines 23-25 and fig 1).

But, Irvin fails to discloses providing the control signal to the motor drive.

However, Crane discloses controlling in a controlled fashion according to a control signal; and a controller providing the control signal to the motor drive according to a desired operating point within an allowable range of operation about a process setpoint; wherein the controller selects the desired operating point according to performance characteristics associated with a plurality of components in the process(see col 7 lines 42-56 and col 7 line 68 and col 8 lines 1-2).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Irvin and combining it with the invention disclosed by Crane.

One of ordinary skill in the art would have been motivated to do this modification because it is known in the art that control information regarding sensed and calculated parameters must be provide to a motor drive in order to optimally operate.

Regarding claims 24 and 25, Irvin in combination with Crane disclose all the limitations of base claim 23. Irvin further discloses wherein the controller is adapted to correlate at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated process efficiency information, and to select the desired operating point as the optimum efficiency point
within the allowable range of operation according to the correlated process efficiency information(see col 10 lines 31-34).

Regarding claim 26, Irvin in combination with Crane disclose all the limitations of base claim 25. Crane further discloses, wherein the controller provides the control signal as a motor speed signal to the motor drive according to the desired operating point. (see col 3 lines 13-15).

Regarding claim 27, Irvin in combination with Crane disclose all the limitations of base claim 25. Irvin further discloses the control system further comprising a user interface, wherein

the controller obtains at least one of the efficiency information, the allowable range. and the process setpoint from a user via the user interface(see col 4 lines 23-31).

Regarding claim 28, Irvin in combination with Crane disclose all the limitations of base claim 25. Crane further discloses the control system wherein the controller comprises a network interface operatively connecting the controller with a host computer through a network, and wherein the controller obtains at least one of the efficiency information. the allowable range, and the process setpoint from the host computer via the network(see col 4 lines 65-67 and fig 1).

Regarding claim 29, Irvin in combination with Crane disclose all the limitations of base claim 25. Crane further discloses the control system wherein the controller comprises a wireless communication device, and wherein the controller obtains the at least one of the efficiency information, the allowable range, and the process setpoint via wireless communications using the wireless communications device(see col 4 lines 61-65).

Regarding claim 30, Irvin in combination with Crane disclose all the limitations of base claim 25. Irvin further discloses the control system wherein the controller obtains at least a portion of one of the efficiency information, the allowable range. and the process setpoint from prior operation of the process(see col 2 lines 15-17).

Regarding claim 31, Irvin in combination with Crane disclose all the limitations of base claim 23. Irvin further discloses the control system wherein the controller is adapted to correlate

component performance information associated with at least two components in the process in order to derive correlated process performance information, and to select the desired operating point as the optimum performance point within the allowable range of operation according to the correlated process performance information(see col 10 lines 31-34).

Regarding claims 32, Irvin in combination with Crane disclose all the limitations of base claim 31. Crane further discloses the control system wherein the controller provides the control signal as a motor speed signal to the motor drive according to the desired operating point(see col 3 lines 13-15).

Regarding claim 33, Irvin in combination with Crane disclose all the limitations of base claim 31. Irvin further discloses the control system of claim wherein the component performance information comprises at least one of life cycle cost information, efficiency information, life expectancy information, safety information, emissions information, operational cost information, MTBF information, noise information, and vibration information(see col 13 line 2).

Regarding claim 36, Irvin in combination with Crane disclose all the limitations of base claim 35. Irvin further discloses the control system wherein the process comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor(see col 1 line 49 and col 1 lines 23-25 and fig 1), and wherein the means for selecting a desired operating point comprises:

means for correlating at least two of motor efficiency information. pump efficiency information. and motor drive efficiency information in order to derive correlated process efficiency information; and means for selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated process efficiency information(see col 10 lines 31-34).

7. Claims 37-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irvin U.S Patent No. 5,742,500 in view of Hays et al U.S. Patent No. 6,260,004.

Regarding claim 37, Irvin discloses a pump control system for automatically operating a pump driven by a motor in a controlled fashion, comprising: a motor drive providing electric power to operate the motor in a controlled fashion (see col 1 line 49 and col 1 lines 23-25 and fig 1).

But, Irvin fails to discloses a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump.

However, Hays et al. discloses a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump: wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump(see abstract lines 1-3 and col 10 lines 39-43).

Therefore at the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the above invention suggested by Irvin and combining it with the invention disclosed by Hays et al.

One of ordinary skill in the art would have been motivated to do this modification because in order to verify the appropiate operation of a system for purposes of maintenance and for changing the operation of the system as suggested by Hays et al.

Regarding claim 38, Irvin in combination with Hays et al. disclose all the limitations of base claim 37. Hays further discloses the pump control system wherein the diagnostic component performs signature analysis of at least one sensor signal from a sensor associated with the pump in order to diagnose the operating condition associated with the pump(see abstract lines 6-11).

Regarding claim 39, Irvin in combination with Hays et al. disclose all the limitations of base claim 38. Hays further discloses control system wherein the at least one sensor signal is related to one of flow, pressure, current, noise, vibration, and temperature associated with the pump(see col 12 line 66) .

Response to Arguments

Applicant's arguments filed 1/23/04 have been fully considered but they are not persuasive. The claims have been amended to include the limitation, automatically. It is noted that the controllers as disclosed in the prior art of record are electronic(computer) systems that automatically control. Even though a person could operate the controller, the controller automatically generates a control signal to be applied to the motor drive.

Claim 1 does not specify what part of the system is being automatically controlled or what makes the system automatic. Furthermore, the argued limitation of communicating the control signal directly to the motor is not in the claims.

The Irvin reference discloses the controller including alarms, displays, logic circuitry, microprocessors, memory, programs etc. These components clearly providing for the automatic control of a pump system. Irvin also discloses that computer driven control systems and methods are known for controlling and optimizing a pump system. Irvin clearly discloses a control system and a method of an operator interfacing with a pump station controller for parameter changing, however the pump station controller automatically monitors and manages(control) the operations of a pump system(see for example col 4 lines 23-31 and col. 15 lines 5-21).

The Hays et al. reference clearly discloses a driver source controller, a microcontroller for automatically providing signal(see for example col 8 lines 16-24, col 9 lines 27-34 and col. 14 lines 63-67). The Crane reference also discloses a microprocessor that automatically controls a pump system(see for example col 1 line 34).

Citation of Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to system and method for dynamic multi-objective optimization of pumping system operation and diagnostic:

a. U.S. Pat. No. 3,068,796 to R.D. PFluger et al., which discloses power level controller.

b. U.S. Pat. No. 3,610,779 to Hubby, which discloses methods and systems for controlling pumping wells.

c. U.S. Pat. No. 3,797,966 to Randell, which discloses control system.

d. U.S. Pat. No. 4,076,458 to Jones et al., which discloses automatic pump speed controller.

e. U.S. Pat. No. 4,204,808 to Reese et al., which discloses flow control.

f. U.S. Pat. No. 4,432,064 to Barker et al., which discloses apparatus for monitoring a plurality of operations.

g. U.S. Pat. No. 5,351,705 to Reinders et al., which discloses method and apparatus for controlling fluid pumps and valves to regulate fluid pressure and to eliminate fluid flow surges.

h. U.S. Pat. No. 5,659,485 to Lee, which discloses discharge flow control system and method in hydraulic pump.

i. U.S. Pat. No. 4,204,808 to Duyar et al., which discloses model-based fault detection system for electric motors.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

pump.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carlos Ortiz-Rodriguez whose telephone number is (703) 305-8009. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo P. Picard can be reached on (703) 308-0538. The central official fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Carlos Ortiz-Rodriguez
Patent Examiner
Art Unit 2125

cror

March 26, 2004

LEO PICARD
SUPERVISORY PATENT EXAMINER
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